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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/027,514 | 12/21/2001 | John M. Pigott | SC11926ZC | 3716 |

23125 7590 09/15/2003

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EXAMINER

MCCLLOUD, RENATA D

ART UNIT PAPER NUMBER

2837

DATE MAILED: 09/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/027,514

Applicant(s)

PIGOTT ET AL

Examiner

Renata McCloud

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. In response to the amendment filed 19 June 2003, paper number 8, the following has occurred:

- (a) The claim objections have been withdrawn by the examiner.
- (b) The 35 U.S.C. 112 rejection has been withdrawn by the examiner.
- (c) Claims 1, 4, 9, 12, 14, 18 and 20 have been amended.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 are rejected under 35 U.S.C. 102(b) as being anticipated by Fincher (U.S. 4,851,755).

Claim 1: The apparatus and method for detecting a stall condition of a stepping motor (Fig. 1:10) of the type which includes at least first (Fig. 1:14a) and second coils (Fig. 1:14b) and a rotor (Fig. 1:12) having a plurality of magnetic poles there around (Col. 3:57-60), the apparatus comprising a current generator (Fig. 1:26) for alternately supplying drive currents to said first and second coils causing the rotor to step (Col. 6:9-11), each of said first and second coils generating signals when transitioning from a

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driven state to a non-driven state, the signals resulting from motion of said rotor (Col. 6:17-24); an integrator having an input coupled to receive signals and for generating an integrated version thereof (Fig. 4E:163); and a comparator coupled to the integrator for comparing the integrated version with a predetermined threshold to detect the stall condition (Fig. 4E: 164).

Claim 2: the signals are of alternating polarity (e.g. Col. 4:66-5:5).

Claim 3: means connected to the integrator for correcting the polarity of the signals (e.g. Col. 4: 30-35).

Claims 9 and 18: An apparatus and method for detecting a stall condition of a stepping motor (Fig. 1:10) of the type which includes at least first (Fig. 1:14a) and second coils (Fig. 1:14b) and a rotor (Fig. 1:12) having a plurality of magnetic poles there around (Col. 3:57-60), the apparatus comprising a current generator (Fig. 1:26) for alternately supplying drive currents to said first and second coils causing the rotor to step (Col. 6:9-11), each of said first and second coils generating back emf voltage signals when transitioning from a driven state to a non-driven state, the signals resulting from motion of said rotor (Col. 5:21-22; 6:17-24); an integrator having an input coupled to receive signals and for generating an integrated version thereof (Fig. 4E:163); and a comparator coupled to the integrator for comparing the integrated version with a predetermined threshold to detect the stall condition (Fig. 4E: 164).

Claim 10: the bemf signals are of alternating polarity (e.g. Col. 4:66-5:5).

Claims 11 and 19: means connected to the integrator for correcting the polarity of the bemf signals (e.g. Col. 4: 30-35).

Claim 13: a comparator coupled to the integrator for comparing the integrated version with a predetermined threshold to detect the stall condition (Fig. 4E: 164).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fincher (U.S. 4,851,755) in view of Gutierrez (U.S. 6,014,000).

Claim 14: Fincher teaches an apparatus for detecting a stall condition of a stepping motor (Fig. 1:10) of the type which includes at least first (Fig. 1:14a) and second coils (Fig. 1:14b) and a rotor (Fig. 1:12) having a plurality of magnetic poles there around (Col. 3:57-60), the apparatus comprising a current generator (Fig. 1:26) for alternately supplying drive currents to said first and second coils causing the rotor to step (Col. 6:9-11), each of said first and second coils generating signals when transitioning from a driven state to a non-driven state, the signals resulting from motion of said rotor (Col. 6:17-24); an integrator having an input coupled to receive signals and for generating an integrated version thereof (Fig. 4E:163); and a comparator coupled to the integrator for comparing the integrated version with a predetermined threshold to detect the stall condition (Fig. 4E: 164). Fincher does not teach a display actuator coupled to the rotor for movement by the rotor to reflect a measure of a variable.

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Gutierrez teaches a display actuator coupled to the rotor for movement by the rotor to reflect a measure of a variable (e.g. Fig. 1: 116). It would have been obvious to one having ordinary skill in the art at the time that the invention was made to modify the apparatus taught by Fincher to include a display as taught by Gutierrez. The advantage of this would be the ability to alert a user of the apparatus that a stall condition has occurred.

Claim 15: Fincher and Gutierrez teach the limitations of claim 14. Referring to claim 15, Fincher teaches the signals are of alternating polarity (e.g. Col. 4:66-5:5), and means coupled to the integrator for correcting the polarity (e.g. Col. 4: 30-35).

Claim 17: Fincher and Gutierrez teach the limitations of claim 14. Referring to claim 17, Fincher teaches a comparator coupled to the integrator for comparing the integrated version with a predetermined threshold to detect the stall condition (Fig. 4E: 164).

6. Claims 4-8,12,16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fincher et al as applied to claims 3,10, 15, and 19 above, in view of Ito et al (U.S. Patent 4,491,424).

Claims 4, 12, 16, and 20: Fincher teaches the limitations of claim 3, 10, 15, and 19. Referring to claims 4, 12, 16, and 20, Fincher does not teach a blanking circuit. Ito et al teach a blanking circuit for masking an initial portion of each signal (Fig. 22), the initial portion corresponding to the time it takes for the drive current in each of said first and second coils to substantially decay (Fig. 26). It would have been obvious to one

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having ordinary skill in the art at the time the invention was made to modify the electronic apparatus taught by Fincher to include the teachings of Ito et al. The advantage of this would be an electronic apparatus with pulse width optimization for driving a motor which does not require an externally connected precision resistance.

Claim 5: Fincher and Ito et al teach the limitations of claim 4. Referring to claim 5, Fincher teaches a control circuit coupled to the current generator and correcting means (e.g. Fig. 1:19).

Claim 6: Fincher and Ito et al teach the limitations of claim 5. Referring to claim 6, Fincher teaches the current generator comprises a first switching circuit coupled to the control circuit and controlled thereby (e.g. Fig. 4D:26a).

Claim 7: Fincher and Ito et al teach the limitations of claim 6. Referring to claim 7, Fincher teaches the polarity correction means comprises a second switching circuit coupled to the control circuit and controlled thereby (e.g. Fig. 4D:26b).

Claim 8: Fincher and Ito et al teach the limitations of claim 7. Referring to claim 8, Ito et al teach the blanking circuit comprises a switching circuit coupled to the control circuit and controlled thereby (e.g. Fig. 22).

Response to Arguments

7. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Renata McCloud whose telephone number is (703) 308-1763. The examiner can normally be reached on Mon.- Fri. from 8 am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi can be reached on (703) 308-3370. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Renata McCloud
Examiner
Art Unit 2837

RDM


ROBERT NAPPI
SUPERVISORY PATENT EXAMINER